

International Decay Data Evaluation Project

E. Browne and the Decay Data Collaboration

Nuclear Scientists from France, Germany, the United Kingdom, and the United States have joined their efforts to evaluate decay data for radionuclides specifically used in applied research and detector calibrations. The participants in this collaboration are M. M. Bé, Laboratoire Primaire des Rayonnements Ionisants (LPRI), Saclay; D. MacMahon, Centre for Analytical Research in the Environment (CARE), Imperial College, London; E. Schönfeld, Physikalisch-Technische Bundesanstalt (PTB), Braunschweig; R.G. Helmer, Idaho National Engineering Laboratory (INEL), Idaho Falls; J.K. Tuli, Brookhaven National Laboratory (BNL), Upton; and E. Browne, Lawrence Berkeley National Laboratory (LBNL). A. Nichols, AEA Technology (AEAT), Harwell and V.P. Chechev, V.G. Khlopin Radium Institute, St. Petersburg have just joined this collaboration and will start their work in 1998.

The purpose of this evaluation effort is to produce *recommended values*, and to suggest new measurements for data that are unsatisfactory. *Uniformity* and *reproducibility* are features of importance for this work. The first one may be achieved by using well-established procedures for data analysis. The second, by describing the analysis of each specific portion of data, as well as presenting the individual results along with recommended values.

Our evaluation procedures include data rejection based on subjective arguments, also identification and possible rejection of statistical outliers. We have adopted the *Limitation of Relative Statistical Weights* [1] method for averaging discrepant data. This method has been extensively applied by IAEA Co-ordinated

Research Programme (CRP) [2], and is currently being used in the United Kingdom for the production of the Activation Product Data Library (UKPADD-2) [3].

Evaluations for the following radionuclides are completed or near completion:

^7Be , ^{22}Na , ^{24}Na , ^{26}Al , ^{40}K , ^{41}Ar , ^{46}Sc , ^{51}Cr , ^{54}Mn , ^{60}Co , ^{65}Zn , ^{68}Ga , ^{68}Ge , ^{75}Se , ^{95}Zr , ^{95}Nb , ^{109}Cd , ^{113}Sn , ^{125}I , ^{137}Cs , $^{137\text{m}}\text{Ba}$, ^{139}Ce , ^{140}Ba , ^{140}La , ^{141}Ce , ^{143}Pr , ^{153}Sm , ^{153}Gd , ^{188}Re , ^{192}Ir , ^{194}Ir , and ^{207}Bi . PTB has recently published 21 of these evaluations in a laboratory report [4], and LBNL has completed five - ^{26}Al , ^{75}Se , ^{188}Re , ^{192}Ir , ^{194}Ir - as part of this effort.

All the evaluations will be used in the publication of the *Table of Radionuclides*, by LPRI and PTB, an extension of the *Table de Radionuclides* [5]. The data will become part of the *Evaluated Nuclear Structure Data File* (ENSDF), a computer file of evaluated experimental nuclear structure and decay data maintained by the National Nuclear Data Center (NNDC) at BNL, and will be submitted to the *International Atomic Energy Agency* (IAEA) for inclusion in its decay-data database.

Footnotes and References

1. M.J. Woods and S. Munster, National Physical Laboratory, Teddington, UK, Report No. RS(EXT) 95, 1988.
2. "X-ray and gamma-ray standards for detector calibration," Report No. IAEA-TECDOC-619, 1991.
3. A.L. Nichols, Nucl. Instr. and Meth. In Phys. Res. **A369**, 516 (1996).
4. E. Schönfeld and G. Rodloff, Physikalisch-Technische Bundesanstalt, Braunschweig, Germany, Report PTB-6.11-97-1, October 1997.
5. F. Lagoutine, N. Coursol, and J. Legrand, "Table de Radionuclides," ISBN-2-7272-0078-1 (LMRI, 1982-1987).